

MCAS Review

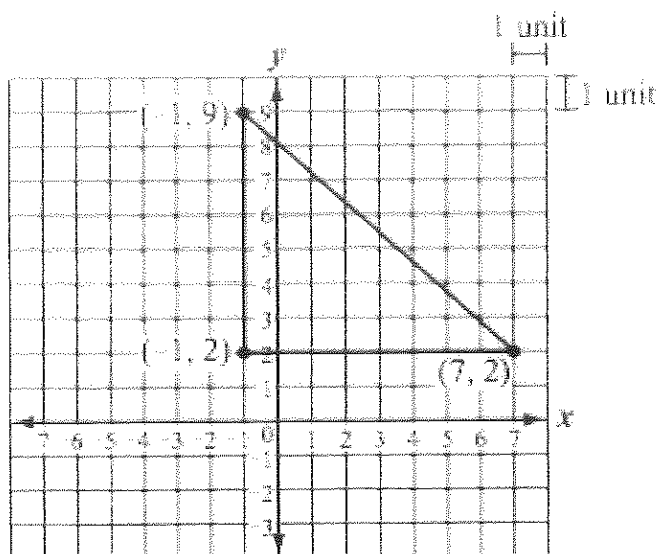
Topic #4: Geometry

Session 1 Questions: No Calculator



Multiple Choice Questions:

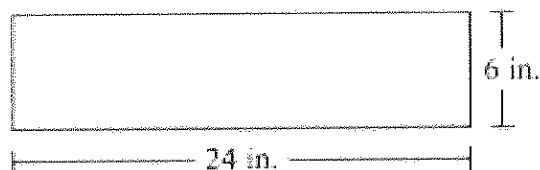
- 8 A triangle is shown on the coordinate plane below.



What is the area of the triangle?

- A. 21 square units
- B. 26 square units
- C. 28 square units
- D. 56 square units

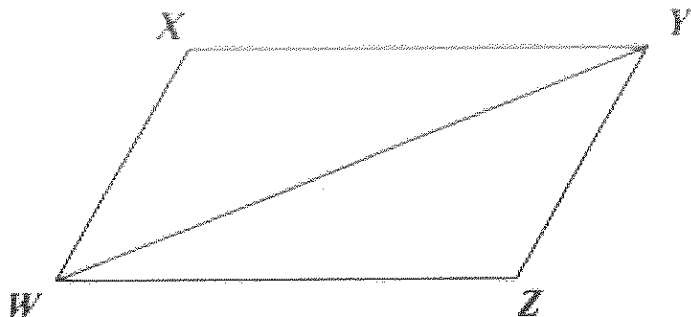
- 12 The diagram below shows a rectangle and its dimensions.



A square has the same area as the rectangle. What is the length of each side of the square?

- A. 12 in.
- B. 15 in.
- C. 30 in.
- D. 36 in.

- 12 Parallelogram $WXYZ$ and diagonal WY are shown in the diagram below.

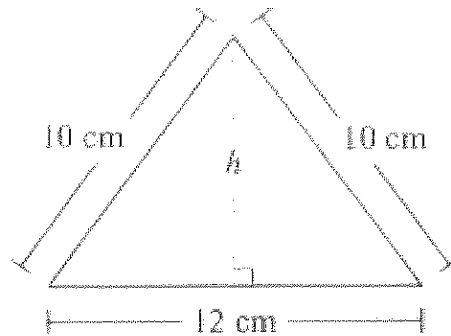


Which of the following statements best proves that $\angle XWY \cong \angle ZYW$?

- A. If two parallel lines are cut by a transversal, then corresponding angles are congruent.
- B. If two parallel lines are cut by a transversal, then complementary angles are congruent.
- C. If two parallel lines are cut by a transversal, then alternate interior angles are congruent.
- D. If two parallel lines are cut by a transversal, then alternate exterior angles are congruent.

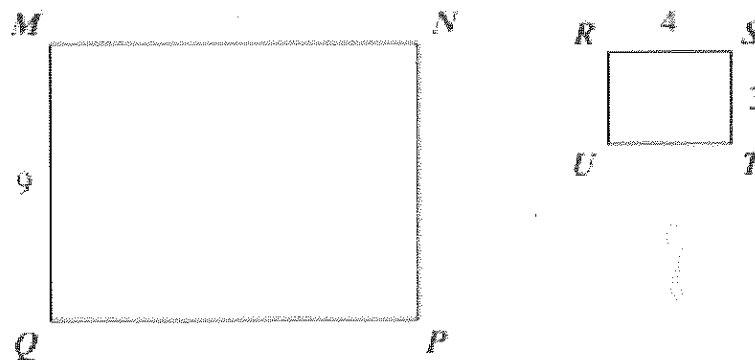
Short Answer Questions:

- 15 The diagram below shows a triangle and some of its measurements.



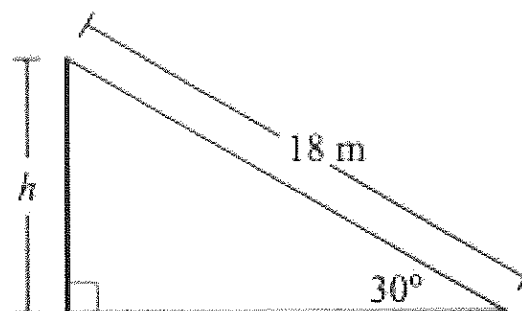
The triangle has an area of 48 square centimeters. What is h , the height, in centimeters, of the triangle?

- 19 In the diagram below, rectangle $MNPQ$ is similar to rectangle $RSTU$.



Based on the given dimensions, what is the length of QP ?

- 15 The diagram below shows a right triangle and some of its measurements.

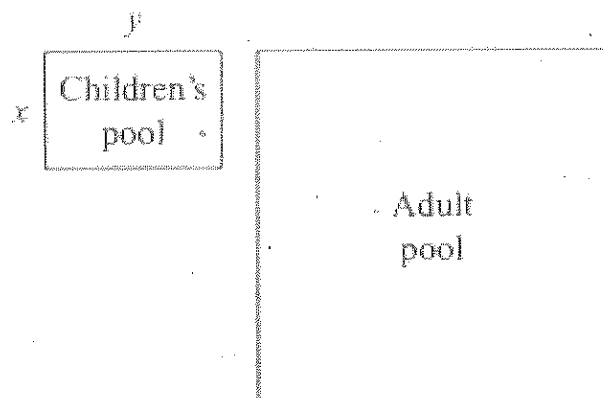


What is h , the height in meters of the triangle?

Open Response Questions:

20

The children's pool and the adult pool in a recreation center are both in the shape of right rectangular prisms. In the diagram below, the two rectangles represent the children's pool and the adult pool.



Define x and y as follows:

- x = the width, in yards, of the children's pool
- y = the length, in yards, of the children's pool

a. Write an expression using x and y to represent the area of the children's pool.

The adult pool has the following measurements:

- The width of the adult pool is 3 times the width of the children's pool.
- The length of the adult pool is 2 times the length of the children's pool.

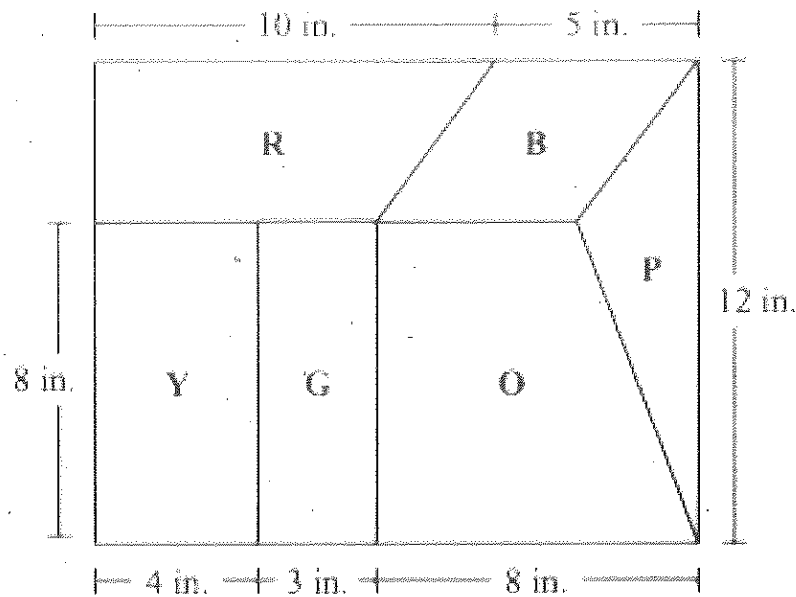
b. Write an expression using x and y to represent the area of the adult pool.

c. What is the ratio of the area of the children's pool to the area of the adult pool? Show or explain how you got your answer.

Both of the pools will be filled with water. The depth of the adult pool is 4 times the depth of the children's pool.

d. What is the ratio of the volume of water in the children's pool to the volume of water in the adult pool? Show or explain how you got your answer.

A puzzle in the shape of a rectangle has six pieces. The puzzle and some of its dimensions are shown in the diagram below.



- a. What is the perimeter, in inches, of the puzzle? Show or explain how you got your answer.

The shape of each piece of the puzzle is listed below.

- Pieces **R** and **O** are trapezoids.
- Pieces **Y** and **G** are rectangles.
- Piece **B** is a parallelogram.
- Piece **P** is a triangle.

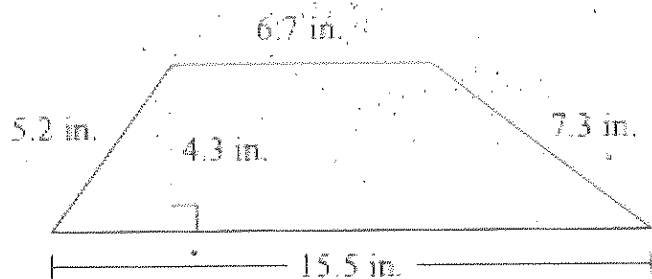
- b. What is the area, in square inches, of piece **B**? Show or explain how you got your answer.
- c. What is the area, in square inches, of piece **R**? Show or explain how you got your answer.
- d. What is the area, in square inches, of piece **P**? Show or explain how you got your answer.

Session 2 Questions: Calculator OK!



Multiple Choice:

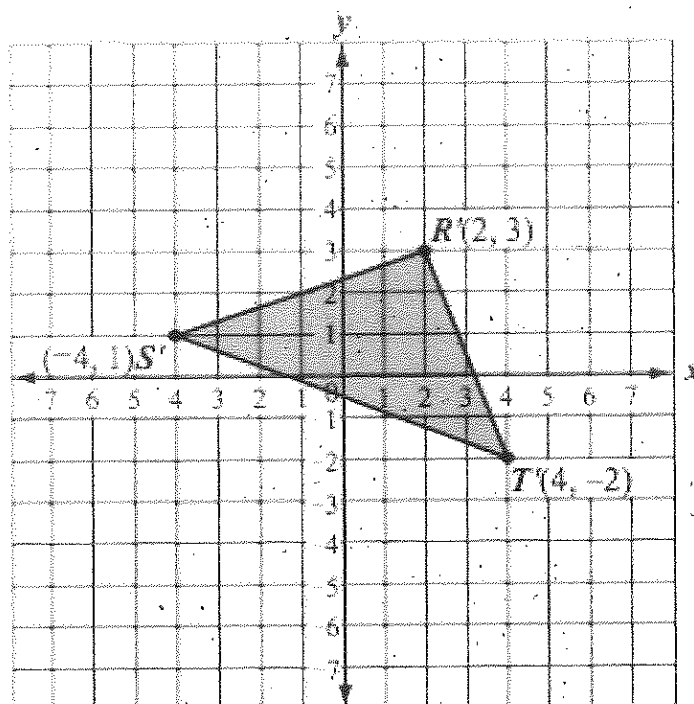
- 22 The diagram below shows a trapezoid and its dimensions.



What is the area of the trapezoid?

- A. 95.46 in.^2
- B. 57.72 in.^2
- C. 47.73 in.^2
- D. 34.70 in.^2

- 26 Triangle $R'S'T'$ is shown on the coordinate grid below.



Triangle $R'S'T'$ is the image of triangle RST after triangle RST was translated 3 units to the right and 4 units up.

What were the coordinates of point R before the translation?

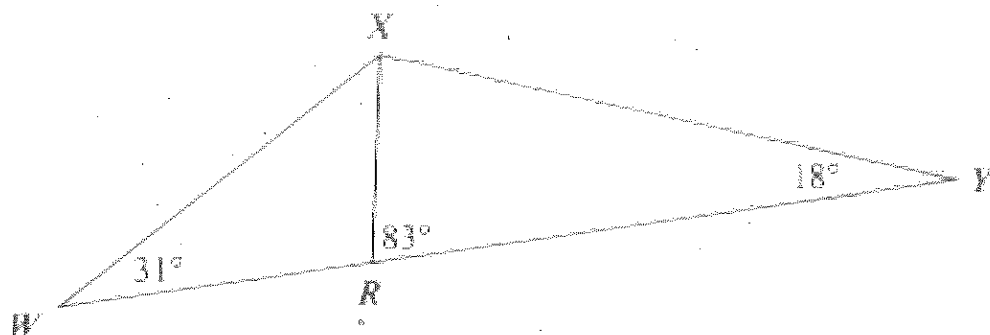
- 38 The diameter of a sphere is 30 centimeters.

Which of the following is closest to the surface area of the sphere?

- A. 377 square centimeters
- B. 2,827 square centimeters
- C. 11,310 square centimeters
- D. 45,239 square centimeters

- A. (6, 6)
- B. (5, 7)
- C. (-2, 0)
- D. (-1, -1)

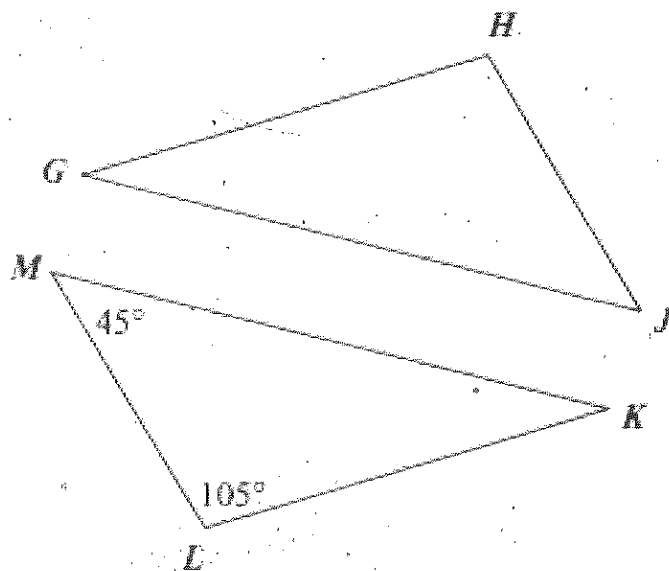
- 32 The diagram below shows $\triangle WXY$. Point R lies on WY .



Based on the angle measures in the diagram, what is $m\angle WXR$?

- A. 52°
- B. 83°
- C. 97°
- D. 131°

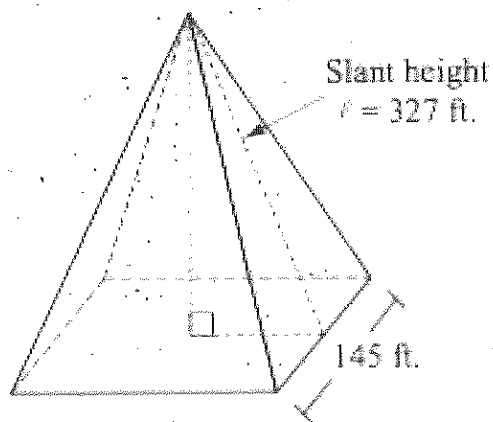
- 36 Triangles GHI and KLM are congruent. The triangles and some of their angle measures are shown in the diagram below.



Based on the angle measures in the diagram, what is $m\angle JGH$?

- A. 30°
- B. 35°
- C. 40°
- D. 45°

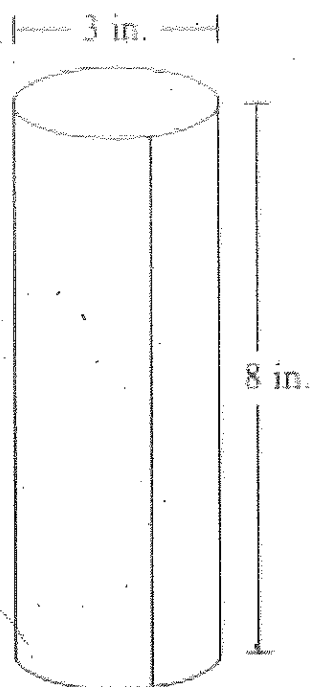
- 34 A right square pyramid and some of its dimensions are shown in the diagram below.



What is the lateral surface area of the pyramid?

- A. 47,415 sq. ft.
- B. 68,440 sq. ft.
- C. 94,830 sq. ft.
- D. 115,855 sq. ft.

- 28 The diagram below shows a piece of paper that has been rolled to form a right circular tube.



Based on the dimensions in the diagram, which of the following is closest to the lateral surface area of the outside of the tube?

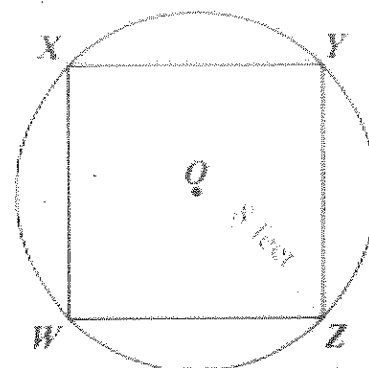
- A. 75 sq. in.
- B. 82 sq. in.
- C. 151 sq. in.
- D. 207 sq. in.

- 33 A rectangle has a length of 15 centimeters and a width of 8 centimeters.

Which of the following is closest to the radius of a circle that has an area equal to the area of the rectangle?

- A. 3 centimeters
- B. 6 centimeters
- C. 11 centimeters
- D. 19 centimeters

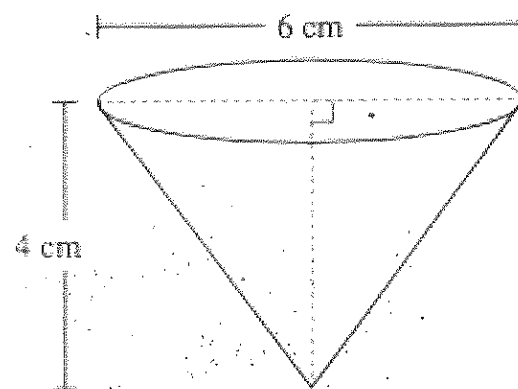
- 40 Square $WXYZ$ is inscribed in circle O , which has a radius of 8 feet, as shown below.



Which of the following is closest to the length of \overline{WZ} ?

- A. 8.0 feet
- B. 11.3 feet
- C. 13.9 feet
- D. 16.0 feet

- 23 A right circular cone and some of its measurements are shown in the diagram below.



Based on the diagram, which of the following is closest to the volume of the cone?

- A. 13 cm^3
- B. 38 cm^3
- C. 113 cm^3
- D. 151 cm^3

28

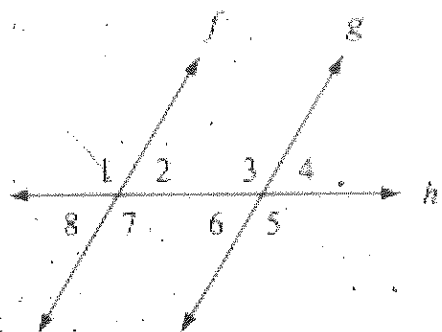
The radius of a large sphere is 8 times the radius of a small sphere.

The surface area of the large sphere is how many times the surface area of the small sphere?

- A. 8
- B. 32
- C. 64
- D. 512

30

In the diagram below, line h is a transversal of lines f and g .

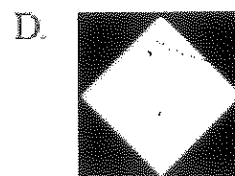
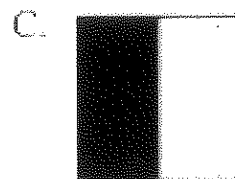
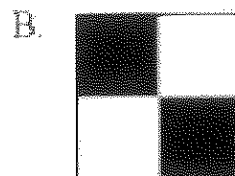
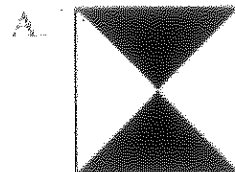


Which of the following relationships proves that lines f and g are parallel?

- A. $\angle 1 \cong \angle 4$
- B. $\angle 1 \cong \angle 5$
- C. $\angle 1 \cong \angle 6$
- D. $\angle 1 \cong \angle 7$

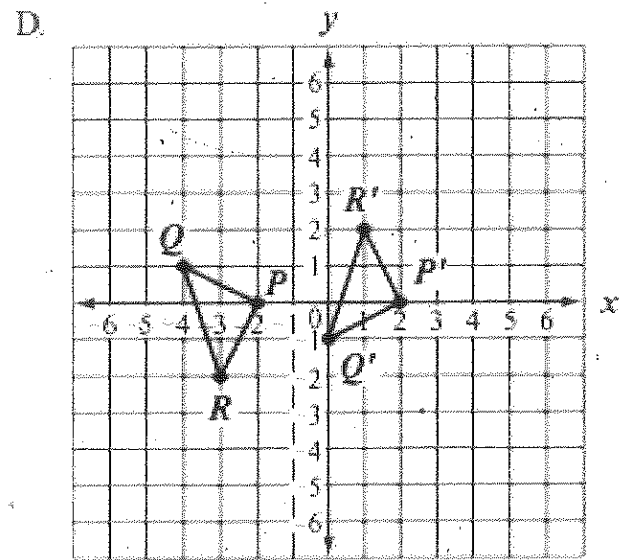
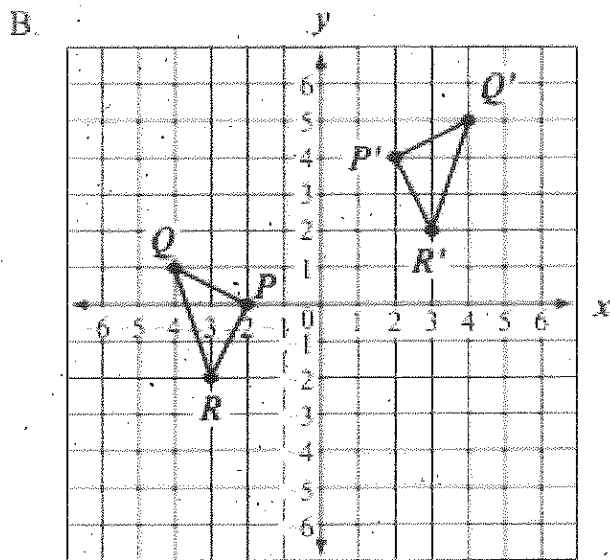
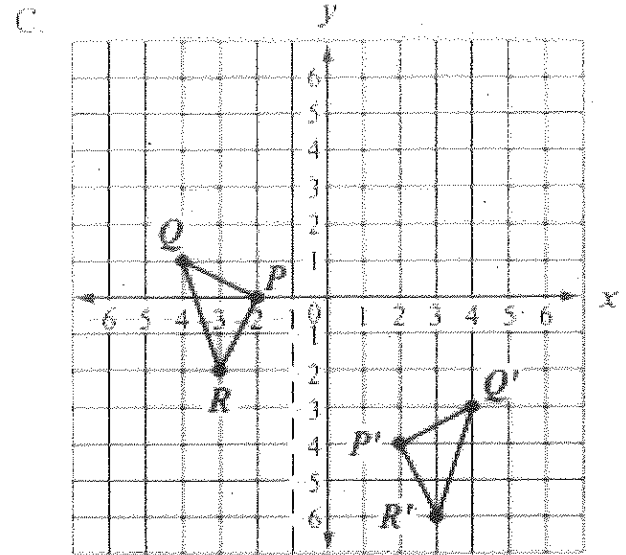
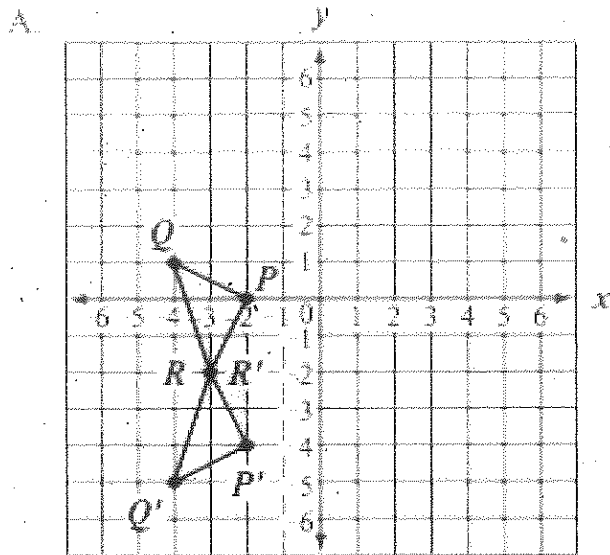
39

Which of the following figures has 90° rotational symmetry?



- 29 On a coordinate grid, triangle PQR is translated 4 units up and then reflected over the y -axis to form triangle $P'Q'R'$.

Which diagram could show triangle PQR , and the location of triangle $P'Q'R'$ after the transformations?



- 38 A right circular cone has a volume of 39 cubic inches and a radius of $2\frac{1}{2}$ inches. Which of the following is closest to the height of the cone?

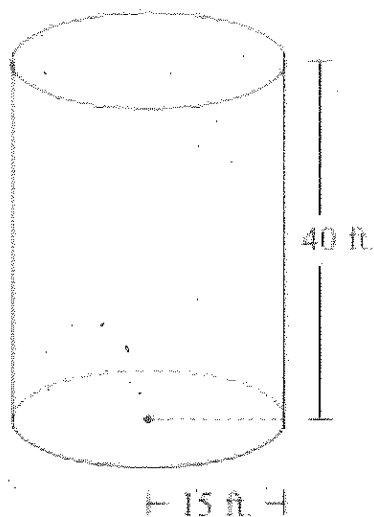
- A. 0.7 inch
- B. 0.8 inch
- C. 6 inches
- D. 7 inches

- 31 A green can and a silver can are each in the shape of a right circular cylinder. The cans have the same radius, but the height of the green can is 3 times the height of the silver can.

What is the ratio of the volume of the green can to the volume of the silver can?

- A. 27:1
- B. 9:1
- C. 6:1
- D. 3:1

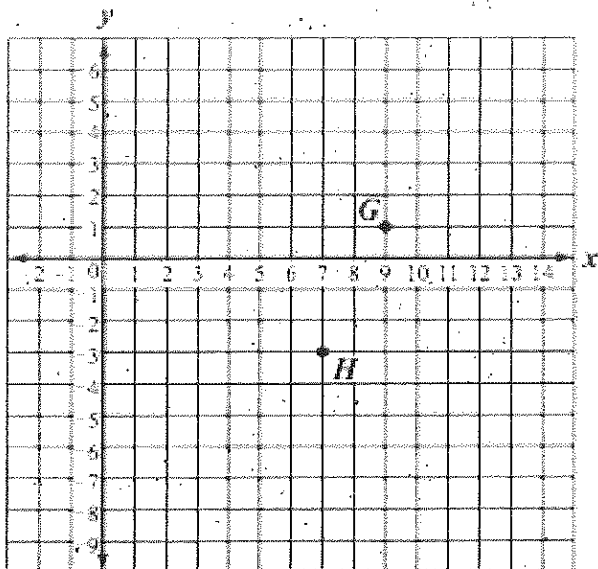
- 25 A water tank in the shape of a right circular cylinder has a height of 40 feet and a radius of 15 feet, as shown in the diagram below.



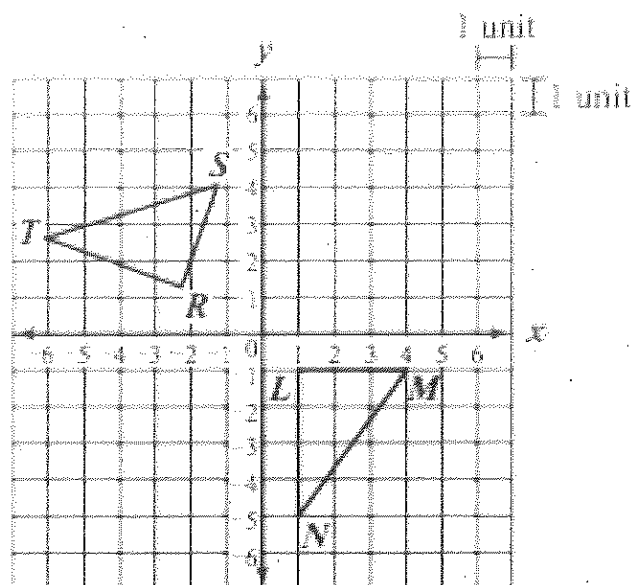
Based on the diagram, what is the volume, in cubic feet, of the water tank?

- A. 225π
- B. 600π
- C. 1200π
- D. 9000π

- 32 A student plotted point $G(9, 1)$ and point $H(7, -3)$ on a coordinate grid, as shown below.



- 35 The diagram below shows $\triangle LMN$ and its image, $\triangle RST$, after a series of transformations in the coordinate plane.



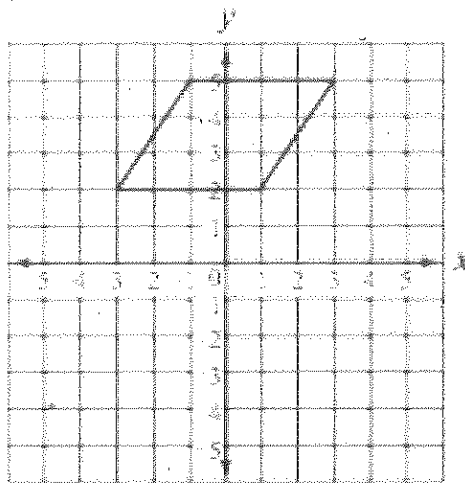
What is the length, in units, of \overline{RT} ?

- A. 3
- B. 3.5
- C. 4
- D. 4.5

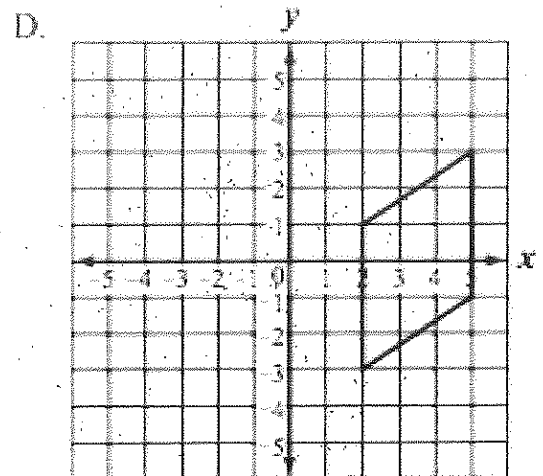
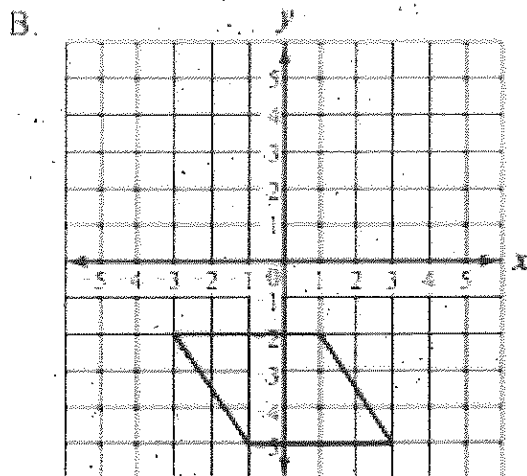
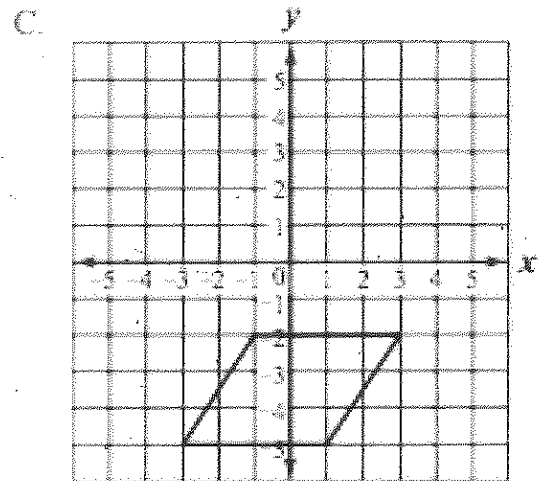
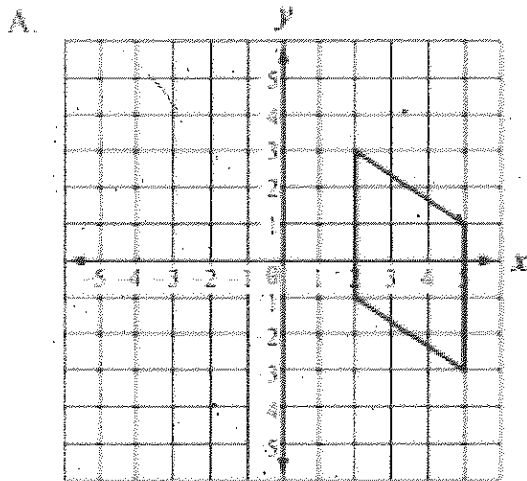
The student will plot point F so that the midpoint of \overline{GF} is point H . What will be the coordinates of point F ?

- A. $(3, -5)$
- B. $(5, -7)$
- C. $(8, -1)$
- D. $(11, 5)$

- 40 A parallelogram is graphed on the coordinate grid below.

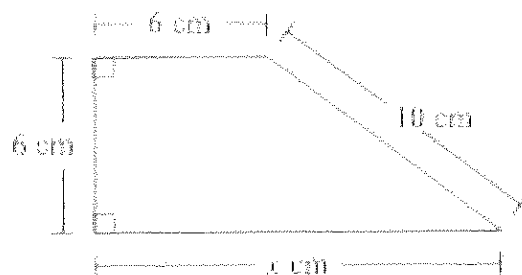


The parallelogram will be rotated 90° clockwise about the origin. Which of the following shows the location of the parallelogram after the rotation?



37

The diagram below shows a trapezoid and its measurements.



The trapezoid has an area of 60 square centimeters.

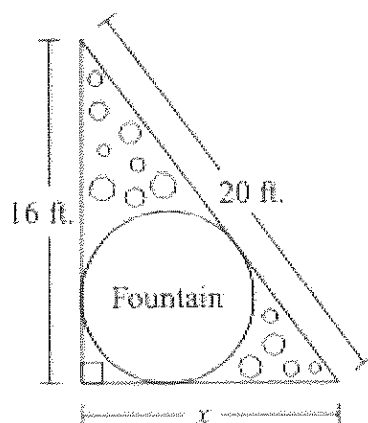
What is the value of x ?

- A. 10
- B. 14
- C. 16
- D. 38

Open Response Questions:

41

A flower bed in the shape of a right triangle has a circular fountain in it. The flower bed and some of its measurements are shown in the diagram below.



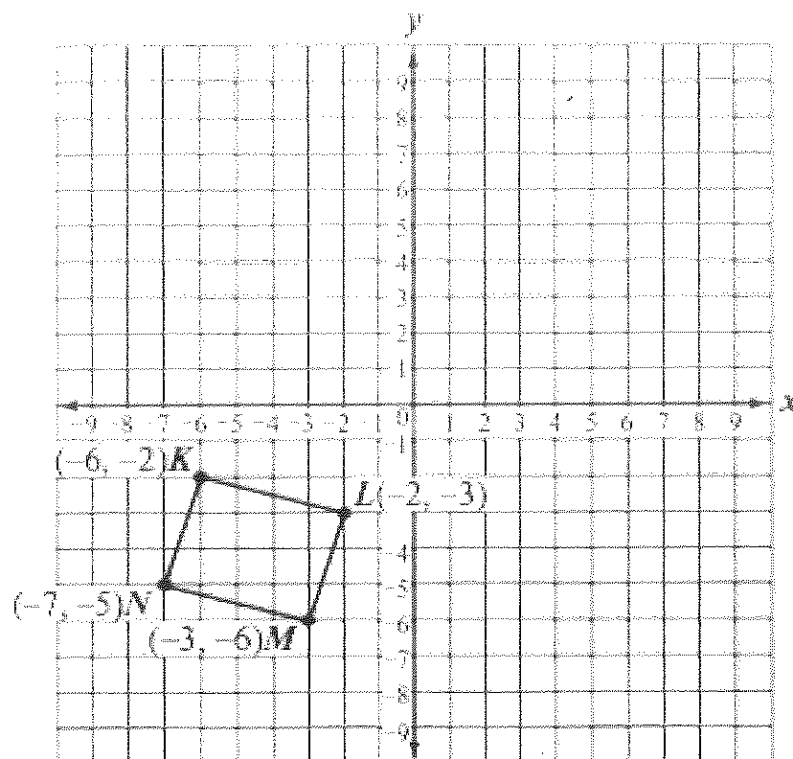
The perimeter of the flower bed is 48 feet.

- a. What is x , the length in feet of the third side of the flower bed? Show or explain how you got your answer.
- b. What is the area, in square feet, of the flower bed, including the fountain? Show or explain how you got your answer.

The circumference of the fountain is 8π feet.

- c. What is the radius, in feet, of the fountain? Show or explain how you got your answer.
- d. What is the area, in square feet, of the flower bed, not including the fountain? Show or explain how you got your answer.

Quadrilateral $KLMN$ is shown on the coordinate grid below.



Copy the coordinate grid and quadrilateral $KLMN$ exactly as shown onto the grid in your Student Answer Booklet.

Quadrilateral $KLMN$ will be translated 9 units up.

- On your grid, draw quadrilateral $K'L'M'N'$, the image of quadrilateral $KLMN$ after it has been translated 9 units up. Be sure to label the vertices.

Quadrilateral $K'L'M'N'$ will be reflected over the y -axis.

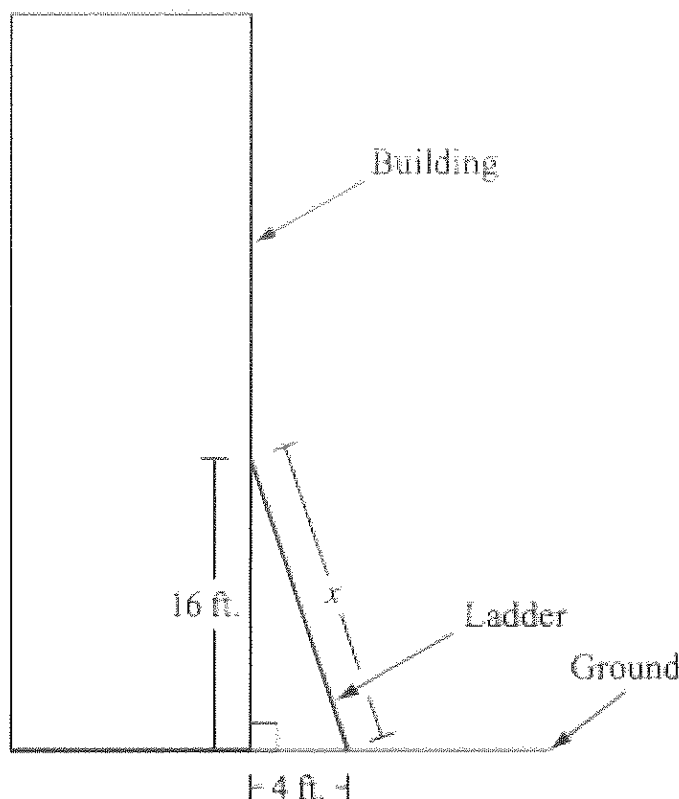
- On your grid, draw quadrilateral $K''L''M''N''$, the image of quadrilateral $K'L'M'N'$ after it has been reflected over the y -axis. Be sure to label the vertices.
- Explain whether a 180° rotation of quadrilateral $KLMN$ about the origin would result in vertices with the same coordinates as $K''L''M''N''$.

Quadrilateral $K''L''M''N''$ will be rotated 90° clockwise about point M'' to create quadrilateral $K'''L'''M'''N'''$.

- What are the coordinates of point K''' ?

41

A ladder is leaning against the side of an office building, as shown in the diagram below.



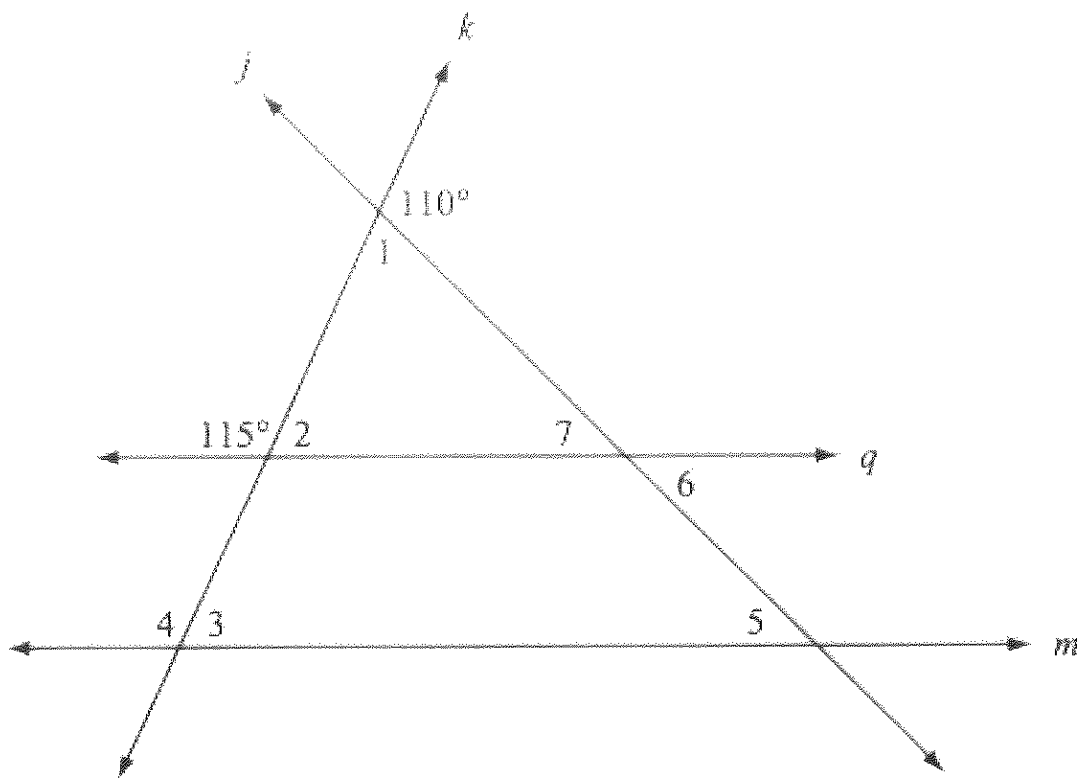
The top of the ladder reaches a point on the building that is 16 feet above the ground. The bottom of the ladder is 4 feet from the base of the building.

- Write an equation that could be used to find x , the length in feet of the ladder.
- Use the equation you wrote in part (a) to find x , the length, to the nearest tenth of a foot, of the ladder. Show or explain how you got your answer.

A second ladder that is 32 feet in length will be leaned against the same building. The bottom of the second ladder will be placed 7 feet from the base of the building.

- What is the height, to the nearest tenth of a foot, of the point the top of the second ladder will reach on the building? Show or explain how you got your answer.

- 2** Parallel lines q and m are cut by transversal lines j and k . The lines, and the measures of some of the angles created by the intersections of the lines, are shown in the diagram below



- What is the measure, in degrees, of $\angle 1$? Show or explain how you got your answer.
- What is the measure, in degrees, of $\angle 3$? Show or explain how you got your answer.
- What is the measure, in degrees, of $\angle 5$? Show or explain how you got your answer.
- What is the measure, in degrees, of $\angle 6$? Show or explain how you got your answer.